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SEAN M. MCGINN
MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER

KANG, DONGHEE

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 03/27/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/087,925

Applicant(s)

YASUKAWA ET AL.

Examiner

Donghee Kang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-7 and 9-15 is/are rejected.
- 7) ☒ Claim(s) 3,4 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 May 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the phrase "said end being filled with a light-transmissible material" in claim 3, the phrase "sealing member adheres to said surface of said case" in claim 4, the phrase "sealing member contains grains or fine particles" in claim 7, the phrase "said grains or fine particles are localized on the bottom side" in claim 8, the phrase "a lens provided on the emission ..." in claim 11, the phrase "surface being shaped like a lens" in claim 12, and the phrase "the emission observation surface is covered with a light-transmission material" in claim 13 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

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Antecedent basis for the claimed subject matter in claims 11-13 are required, namely:

the "further comprising a lens provided on the emission ...", "said surface being shaped like a lens", and "the emission observation surface is covered with a light-transmissible material", respectively, which are not disclosed in the description section of the specification.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims **1-2 & 5-6** are rejected under 35 U.S.C. 102(e) as being anticipated by Ishinaga (US 2002/0134988).

Regarding claim **1**, Ishinaga teaches a light-emitting device comprising (Fig.2): a light-emitting element (12); a case (20) including a cup-like portion having a bottom on which said light-emitting element is mounted; a sealing member (24) with which said cup-like portion is filled so that said light-emitting element is covered with said sealing member; and a gap layer (26) having a lower refractive index formed between said sealing member and a surface of said case shaping a side surface of said cup-like portion. Ishinaga does not expressly teach the gap layer having a refractive

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index lower than that of said sealing member. However, this feature is inherent because sealing member 24 of Ishinaga and sealing member 40 of this invention both comprise an epoxy resin material.

Regarding claim 2, Ishinaga teaches said low-refractive-index layer is made of a gap between said sealing member and said surface of said case.

Regarding claim 5, Ishinaga does not expressly teach said surface of said case being reflective. However, the surface of case 20 is reflective because the case 20 is formed of opaque resin, liquid crystal polymer (page 2, section 0017). The opaque resin uses as a reflector in the art.

Regarding claim 6, Ishinaga teaches said sealing member is made of epoxy resin (page 2, section 0019).

Regarding claim 15, Ishinaga teaches a light-emitting device comprising (Fig.2): a light-emitting element (12); a substrate (14) on which said light-emitting element is mounted; and a sealing member (24) with which said light-emitting element is covered, light emitted from said light-emitting element being partially reflected by a surface of said sealing member to thereby be radiated as light in a direction of an optical axis (page 2, section 0022).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims **7 & 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishinaga (US 2002/0134988) in view of Lai et al. (US 4,888,634).

Ishinaga does not teach said sealing member containing grains or fine particles of a light-transmissible material, which have a linear expansion coefficient smaller than that of said sealing member. However, Lai et al. in Fig.2 teach the high thermal resistance material such as glass beads are dispersed in epoxy resin (sealing member). The glass beads increase the thermal resistance of the epoxy resin. Thus, the epoxy resin exhibits a low thermal expansion hence undergoing low stress. See also Col.1, lines 30-53 & Col.2, lines 11-50.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the sealing member of Ishinaga with the sealing member containing glass beads as taught by Lai, since the glass beads functions to lower the coefficient of thermal expansion of the epoxy resin, thereby reducing stress of epoxy resin while operating the device. Lai et al. do not expressly teach that the glass beads are a light transmissible material. However, this feature is inherent because the grains of this invention also comprise a glass beads (see disclosure; page 14, lines 14-15).

8. Claims **10 & 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishinaga (US 2002/0134988) in view of Vriens et al. (US 5,813,753).

Regarding claim **10**, Ishinaga does not teach said sealing member containing a fluorescent substance. Vriens et al. in Fig.2 teach conversion of UV/blue light from an

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LED to visible light using fluorescent substance (phosphor grains 24) dispersed in the sealing member (25). Such UV/blue-LED phosphor devices, for example, offer the opportunity to encompass a wider color range, which is important for display as well as for illumination applications (Col.1, lines 55-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add fluorescent substance as taught by Vriens into sealing member of Ishinaga to convert the light from LED to a different light, since such conversion of light offers the opportunity to encompass a wider color range, which is important for display as well as for illumination application.

Regarding claim **14**, Ishinaga does not teach said light-emitting element including at least one group III nitride compound semiconductor layer. Group III nitride compound semiconductors have been recognized as having great potential as a technological materials of LEDs and semiconductor lasers and also taught by Vriens et al. forming UV/blue LED based on group III nitride compound materials, GaN (Col.3, lines 6-7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the LED based on group III nitride compound semiconductor material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as matter of obvious design choice. In re Leshin, 125 USPQ 416.

9. Claim **11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishinaga (US 2002/0134988) in view of Koike et al. (US 6,345,903).

Ishinaga does not teach the light-emitting device further comprising a lens provided on the emission observation surface side of said light-emitting device. However, Koike et al. in Fig.2 teach the light-emitting device comprising a lens (29) for condensing or gathering light emitted from the light emitting diode. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the lens as taught by Koike into the Ishinaga's device in order to increase the light take-out efficiency.

10. Claims **12-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishinaga (US 2002/0134988) in view of Hohn et al. (US 6,066,861).

Regarding claim **12**, Ishinaga teaches said sealing member having a surface on the emission observation surface side but does not teach the surface being shaped like a lens. Hohn et al. in Fig.4 teach the sealing member (5) having a surface being shaped like a lens. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the sealing member having a surface being shaped like a lens in Ishinaga's device in order to increase the light take-out efficiency.

Regarding claim **13**, Ishinaga does not teach an emission observation surface is covered with a light-transmissible material. Hohn et al. teach the emission observation surface is covered with a light-emitting material (10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to surround the LED by a transparent housing in order to protect the LED.

Allowable Subject Matter

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11. Claims **3-4 & 8** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Prior art references, taken along or in combination, do not teach or render obvious that the end of gap on the emission observation surface side is filled with a light-transmissible material. As a result, external dust, dirt, moisture can be prevented from entering the gap.

Prior art reference, taken along or in combination, do not teach or render obvious that on the bottom side of the cup-like portion, the sealing member adheres to the surface of the case shaping the side surface of the cup-like portion. This arrangement prevents peeling of the sealing member and improves stability of the light-emitting device.

Prior art reference, taken along or in combination, do not teach or render obvious that grains or fine particles are localized on the bottom side of the cup-like portion where the sealing member is thermally hardened. As a result, the sealing member adheres to the side surface of the case on the bottom side of the cup-like portion.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Donghee Kang
Patent Examiner

dhk
March 24, 2003